REMARKS

Claims1-18 are pending in the application and are rejected.

Claims 1, 3-6, 15 and 17 were rejected under 35 USC § 103(a) as being unpatentable over Spahn in view of Green and Yamazaki for the reasons stated in the previous office action.

Claims 2, 8-14, 16 and 18 were rejected under 35 USC § 103(a) as being unpatentable over Spahn in view of Green and Yamazaki and taken in further view of Tanabe and Takagi for the reasons stated in the previous office action.

Claims 7 and 12-14 were rejected under 35 USC § 103(a) as being unpatentable over Spahn in view of Green, Yamazaki, Tanabe and Takagi, and in further view of Steube for the reasons stated in the previous office action.

There are two independent claims in this case, Claim 1 and Claim 2.

Amended Claim 1 is believed to be representative and it will be discussed relative to Fig. 7 of the present application. As shown in Fig. 7, a bias heater power supply (520) is used to heat a bias heater (20) to a bias temperature which is insufficient to cause the solid organic in the container (30) to vaporize. See element d) of Claim 1. A vaporization heater power supply (440) is provided for heating a vaporization heater (40) to cause vaporization heat to be applied to uppermost portions of the solid organic material in the container (30) causing such uppermost portions to vaporize. See element e) of Claim 1.

With reference to amended Claim 2, in Fig. 7 of the present case the bias heater power supply (520) is used for controllably applying an electrical potential to the bias heater (20) in response to a control signal provided by a bias heater temperature-measuring device to cause controlled bias heat to be applied to the solid organic material in the container (30), the controlled bias heat providing a bias temperature which is insufficient to cause the slid organic material to vaporize.

With reference to element e) of Claim 2, the vaporization heater power supply (440) is used for controllably applying an electrical potential to the vaporization heater (40) in response to a control signal provided by a deposition

rate-monitoring device to cause controlled vaporization heat to be applied to uppermost portions of the solid organic material in the container (30) causing such uppermost portions to controllably vaporize.

Claim 1 (amended) and claim 2 (amended) are provided so as to include the features that the bias heater is heated by a bias heater power supply and the vaporization heater is heated by a vaporization heater power supply, in view of the Examiner's notation on page 2 of the July 8 office action.

In the detailed description of his embodiments, Spahn discloses an electrically conductive housing (10, 70) defining an enclosure. The housing is further defined by a top plate (20, 80) having an electrically conductive portion, and an electrically conductive baffle member (30, 90). The electrically conductive housing is in electrical contact with the conductive portion of the top plate. Electroluminescent material received in the enclosure is vaporized by applying an electrical potential to both the electrically conductive housing and to the top plate, the electrical potential provided by a single power source (240), as shown in Fig. 4 of Spahn.

Thus, Spahn doesn't teach, suggest or provide any motivation for the use of separate or independent power sources to independently heat such electrically conductive housing and such conductive portion of the top plate.

The Examiner refers to Spahn, col. 4, lines 16-40, and particularly to lines 33-36, which state that the walls of the housing defining the enclosure can be made of a dielectric material, such as, for example, a ceramic material.

Indeed, Spahn describes an embodiment of a vapor source with reference to Fig. 9, in which heating of a solid electroluminescent material occurs by radiation from a resistively heated top plate (20) and an attached baffle member (30), with side walls 56, 58 (and 52 and 54, not shown) and bottom wall 55 of housing 50 constructed of an electrically non-conductive material having an exterior surface thereof coated with a refractory metal mirror material (60) so as to retain most of the radiation from the top plate and from the baffle member within the source housing (50).

The Examiner also notes that both, Spahn (col. 1, lines 43-46) and Green, U.S. 5,584,935 (Figs. 1 and 2) teach that it was well known in the art that

such a ceramic container or housing can be heated by a surrounding resistive heater.

With refercnce to Fig. 9 of Spahn, the use of a ceramic or electrically non-conductive housing (50) voids or climinates a provision of a bias heater. Accordingly, the disclosure of Spahn to use a ceramic container or housing does call for a separate bias heater which is independently driven. Green uses a single heater (3), heated by a single power supply, to provide vaporization of metal oxide which are received in a crystal container (2) which is closed at the base and open at the top. The heater (3) is supported inside an aluminum container (4). The crystal container (2) contains the material (1), and is arranged in such a way that the material evaporating cannot come into contact with the heater (3). Clearly, there is no rcason to combine Spahn and Green.

Spahn uses a single power supply (240) and shows a deposition rate monitor (274) in Fig. 4, to monitor a deposition rate, but not to control the power supply (240).

Tanabe uscs a single power supply (7) to heat a single heater (3) of a vapor source (2). A control unit (6) is coupled to the power supply (7). The control unit (6) sequentially controls the power supply first in response to a signal representative of a temperature of the vapor source (2), and second in response to a signal provided by an evaporation rate detector (5). The power supply (7) in turn, supplies controlled electric current or power to the heater (3) to generate the necessary heat. The vapor source (2) of Tanabe does not include a vaporization heater disposed on upper side wall surfaces of a container, and does not include a vapor efflux slit aperture defined in a vaporization heater. Applicants fail to see how Spahn can be combined with Tanabe to suggest the subject matter set forth in either of Claims 1 or 2 since both references use a single power supply.

Claims 1, 3-6, 15 and 17 were rejected as being unpatentable over Spahn in view of Green and Yamazaki.

As indicated above, the claims of Spahn are limited to an electrically insulative container which is heated by a vaporization heater having a vapor efflux aperture slit. The detailed description of all embodiments of Spahn, with the exception of the embodiment shown in Fig. 9, includes an electrically conductive and heatable housing which defines an enclosure for receiving solid

organic material, and a vaporization heater supporting a baffle member disposed over the enclosure.

Green does not use a bias heater but a vaporization heater (3, 11) which surrounds side wall surfaces and a bottom surface of an electrically insulative crystal container (2, 9). The vaporization heater side walls are shorter than the container side walls because Green wants to avoid contamination.

In contrast to the vapor source of Green, the claimed vapor source of both Claims 1 and 2 includes an electrically insulative container disposed in a bias heater wherein the bias heater side walls are shorter than the container side walls so that a vaporization heater can be disposed on upper side wall surfaces of the container to provide electrical isolation between the bias heater and the vaporization heater by a portion of the side walls of the electrically insulative container.

Yamazaki does teach that it is desirable to deposit OLED coatings on large substrates by using means for providing relative motion between an evaporation source and a substrate.

Claims 2, 8-14, 16 and 18 were rejected as being unpatentable over Spahn in view of Green and Yamazaki for the reasons stated above, taken in further view of temperature control of Tanabe and Tagaki and Steube.

Spahn, Green and Yamazaki have been discussed above. In the last Office Action Applicants stated, "turning to Steube, Applicants fail to see why this reference would have any suggestion for combination with any of the cited references. Steube does indeed teach the use of a screw drive for a vacuum evaporative source, but this source is not directed to OLED and is considerably different than the source claimed in claims 1 and 2".

It is believed that these changes now make the claims clear and definite and, if there are any problems with these changes, Applicants' attorney would appreciate a telephone call.

In view of the foregoing, it is believed none of the references, taken singly or in combination, disclose the invention set forth in independent Claims 1 and 2. The remaining claims depend from Claims 1 and 2 and should be allowed along with them.

Accordingly, this application is believed to be in condition for allowance, the notice of which is respectfully requested.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to Show Changes Made"**.

Respectfully submitted,

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Enclosure

Version With Markings To Show Changes Made

In the Claims:

Claim 1 has been amended as set forth below:

1. (once amended) A thermal physical vapor deposition source for vaporizing solid organic materials and applying a vaporized organic material as a layer onto a surface of a structure in a chamber at reduced pressure in forming an organic light-emitting device (OLED), comprising:

a) a bias heater defined by side walls and a bottom wall, the side walls having a height dimension H_B;

b) an electrically insulative container disposed in the bias heater, the container receiving solid organic material which can be vaporized, the container defined by side walls and a bottom wall, and the container side walls having a height dimension H_C which is greater than the height dimension H_B of the bias heater side walls;

c) a vaporization heater disposed on upper side wall surfaces of the container, the vaporization heater defining a vapor efflux slit aperture extending into the container for permitting vaporized organic material to pass through the slit aperture and onto the surface of the structure;

d) [means] <u>a bias heater power supply</u> for applying an electrical potential to the bias heater to cause bias heat to be applied to the solid organic material in the container, the bias heat providing a bias temperature which is insufficient to cause the solid organic material to vaporize;

e) [means] <u>a vaporization heater power supply</u> for applying an electrical potential to the vaporization heater to cause vaporization heat to be applied to uppermost portions of the solid organic material in the container causing such uppermost portions to vaporize so that vaporized organic material is projected onto the structure through the efflux slit aperture to provide an organic layer on the structure; and

f) means for providing relative motion between the vapor deposition source and the structure to provide a substantially uniform organic layer on the structure.

Claim 2 has been amended as set forth below:

2. (Once amended) A thermal physical vapor deposition source for vaporizing solid organic materials and applying a vaporized organic material as a layer onto a surface of a structure in a chamber at reduced pressure in forming an organic light-emitting device (OLED), comprising:

a) a bias heater defined by side walls and a bottom wall, the side walls having a height dimension H_B;

b) an electrically insulative container disposed in the bias heater, the container receiving solid organic material which can be vaporized, the container defined by side walls and a bottom wall, and the container side walls having a height dimension H_C which is greater than the height dimension H_B of the bias heater side walls;

c) a vaporization heater disposed on upper side wall surfaces of the container, the vaporization heater defining a vapor efflux slit aperture extending into the container for permitting vaporized organic material to pass through the slit aperture and onto the surface of the structure;

d) [means] a bias heater power supply for controllably applying an electrical potential to the bias heater in response to a control signal provided by a bias heater temperature-measuring device to cause controlled bias heat to be applied to the solid organic material in the container, the controlled bias heat providing a bias temperature which is insufficient to cause the solid organic material to vaporize;

e) [means] a vaporization heater power supply for controllably applying an electrical potential to the vaporization heater in response to a control signal provided by a deposition rate-measuring device to cause controlled vaporization heat to be applied to uppermost portions of the solid organic material in the container causing such uppermost portions to controllably vaporize so that vaporized organic material is projected onto the structure through the efflux slit aperture to provide an organic layer on the structure; and

f) means for providing relative motion between the vapor deposition source and the structure to provide a substantially uniform organic layer on the structure.